Lori S. Glaze, Ph.D., NASA Planetary Science Division Director

Planetary Science and Astrobiology Decadal Survey Initial Response Townhall

August 18, 2022

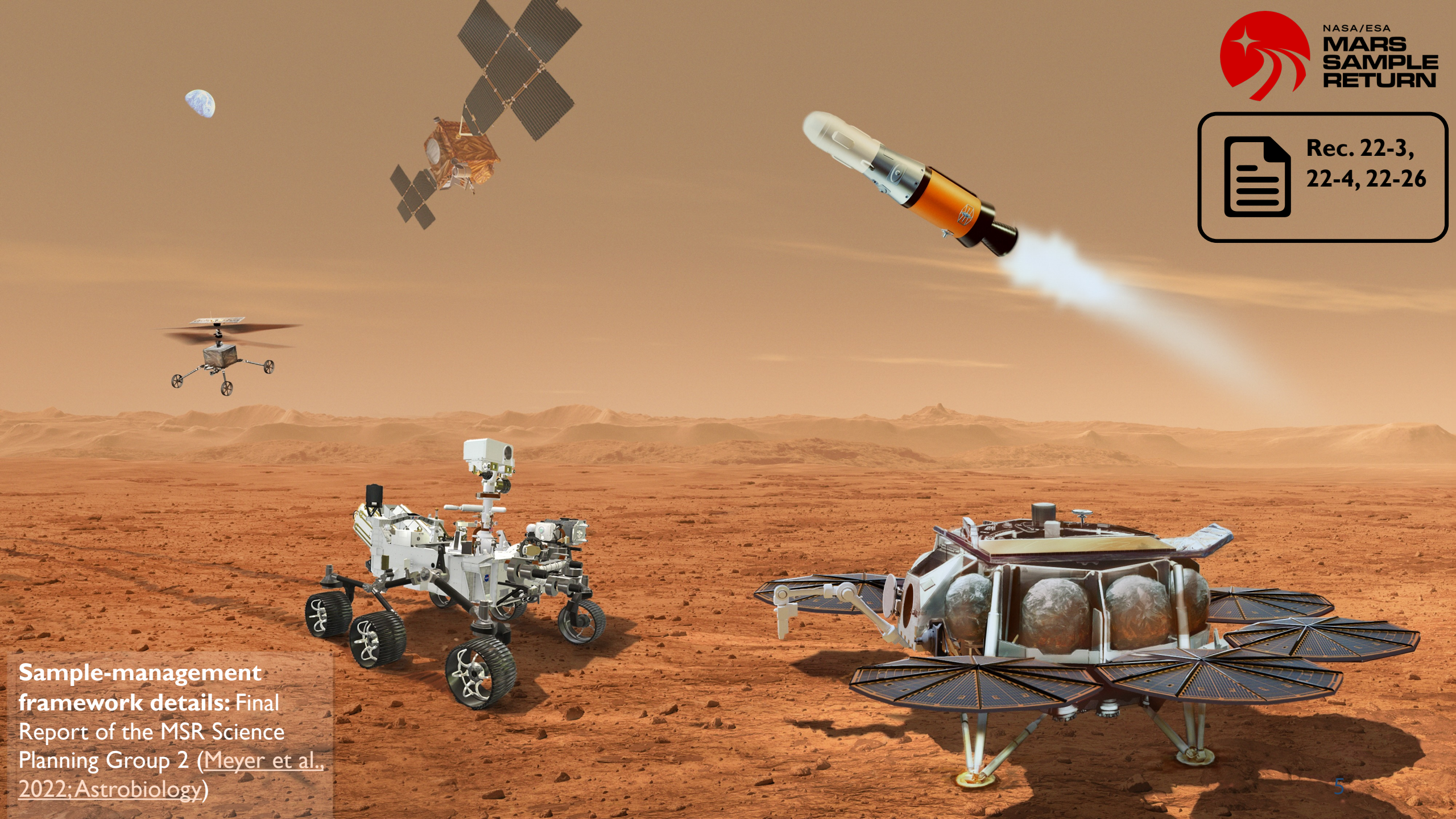
Thank You to All

Steering Group	Moon and Mercury	Venus	Mars	Small Bodies	Ocean Worlds & Dwarf Planets	Giant Planet Systems
Robin Canup*	Tim Grove	Paul Byrne	Vicky Hamilton	Nancy Chabot	Alex Hayes	Jonathan Lunine
Phil Christensen*	Brett Denevi	Larry Esposito	Bethany Ehlmann	Carol Raymond	Francis Nimmo	Amy Simon
Mahzarin Banaji	James Day	Giada Arney	Will Brinckerhoff	Paul Abell	Morgan Cable	Frances Bagenal
Steve Battel	Alex Evans	Amanda Brecht	Tracy Gregg	Bill Bottke	Alfonso Davila	Richard Dissly
Lars Borg	Sarah Fagents	Thomas Cravens	Jasper Halekas	Megan Bruck Syal	Glen Fountain	Leigh Fletcher
Athena Coustenis	Bill Farrell	Kandis Jessup	Jack Holt	Harold Connolly	Chris German	Tristan Guillot
James Crocker	Caleb Fassett	James Kasting	Joel Hurowitz	Tom Jones	Chris Glein	Matthew Heldman
Brett Denevi	Jennifer Heldmann	Scott King	Bruce Jakosky	Stefanie Milam	Candice Hansen	Ravit Helled
Bethany Ehlmann	Toshi Hirabayashi	Bernard Marty	Michael Manga	Ed Rivera-Valentin	Emily Martin	Kathleen Mandt
Larry Espositio	James Keane	Thomas Navarro	Hap McSween	Dan Scheeres	Marc Neveu	Alyssa Rhoden
Orlando Figueroa	Francis McCubbin	Joseph O'Rourke	Claire Newman	Rhonda Stroud	Carol Paty	Paul Schenk
John Grunsfeld	Miki Nakajima	Jennifer Rocca	Miguel San Martin	Myriam Telus	Lynnae Quick	Michael Wong
Julie Huber	Mark Saunders	Alison Santos	Kirsten Siebach	Audrey Thirouin	Jason Soderblum	
Krishan Khurana	Sonia Tikoo-Schantz	Jennifer Whitten	Amy Williams	Chad Trujillo	Krista Soderlund	
Bill McKinnoon			Robin Wordsworth	Ben Weiss		
Francis Nimmmo						
Carol Raymond						
Barbara Sherwood Lollar						
Amy Simon						

*Co-Chairs


The National Academies of
SCIENCES · ENGINEERING · MEDICINE
ORIGINS, WORLDS, AND LIFE
A Decadal Strategy for Planetary Science & Astrobiology
2023–2032

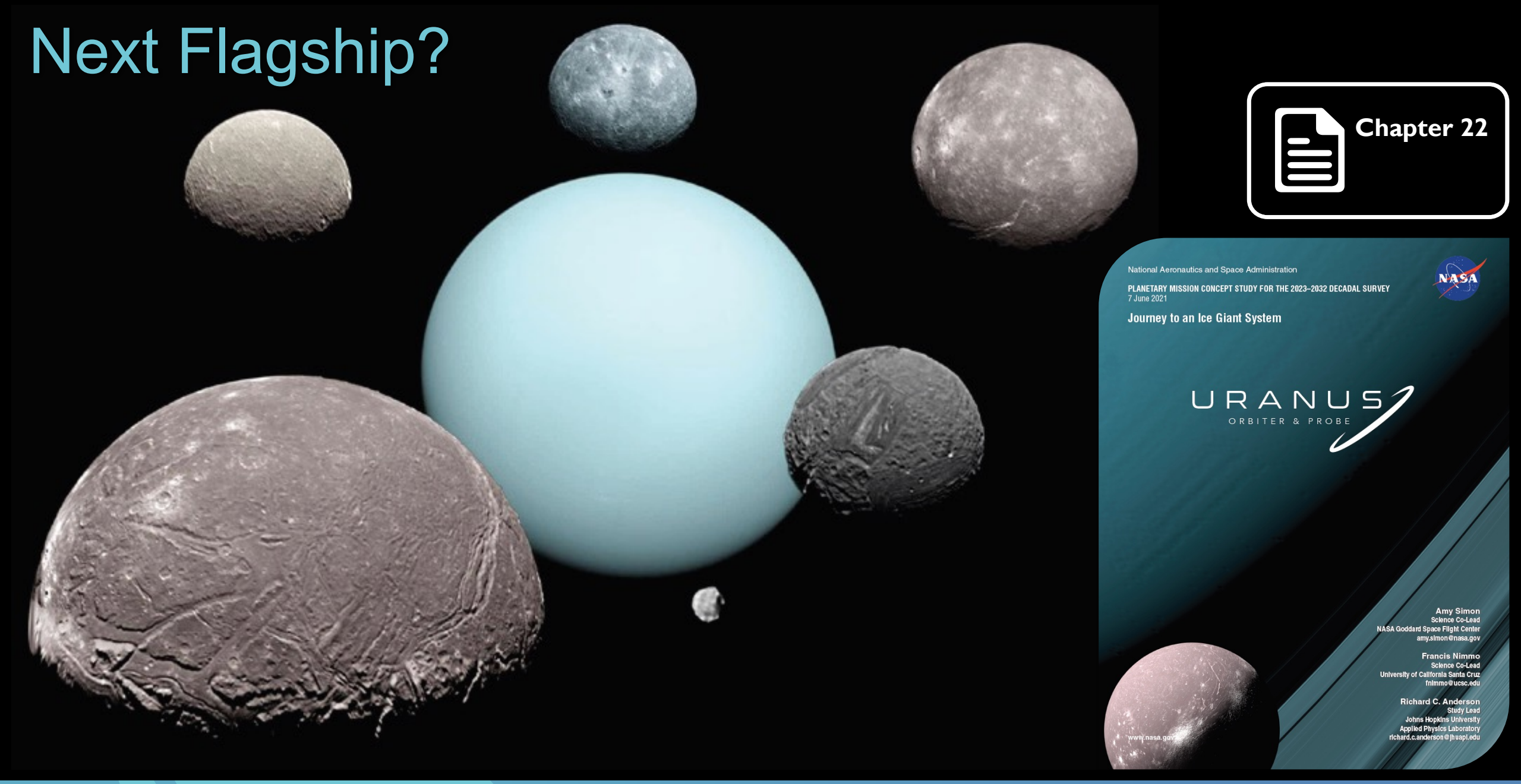
Initial Response – Part 1



Sample-management framework details: Final Report of the MSR Science Planning Group 2 (Meyer et al., 2022; Astrobiology)

Next Flagship?

Chapter 22



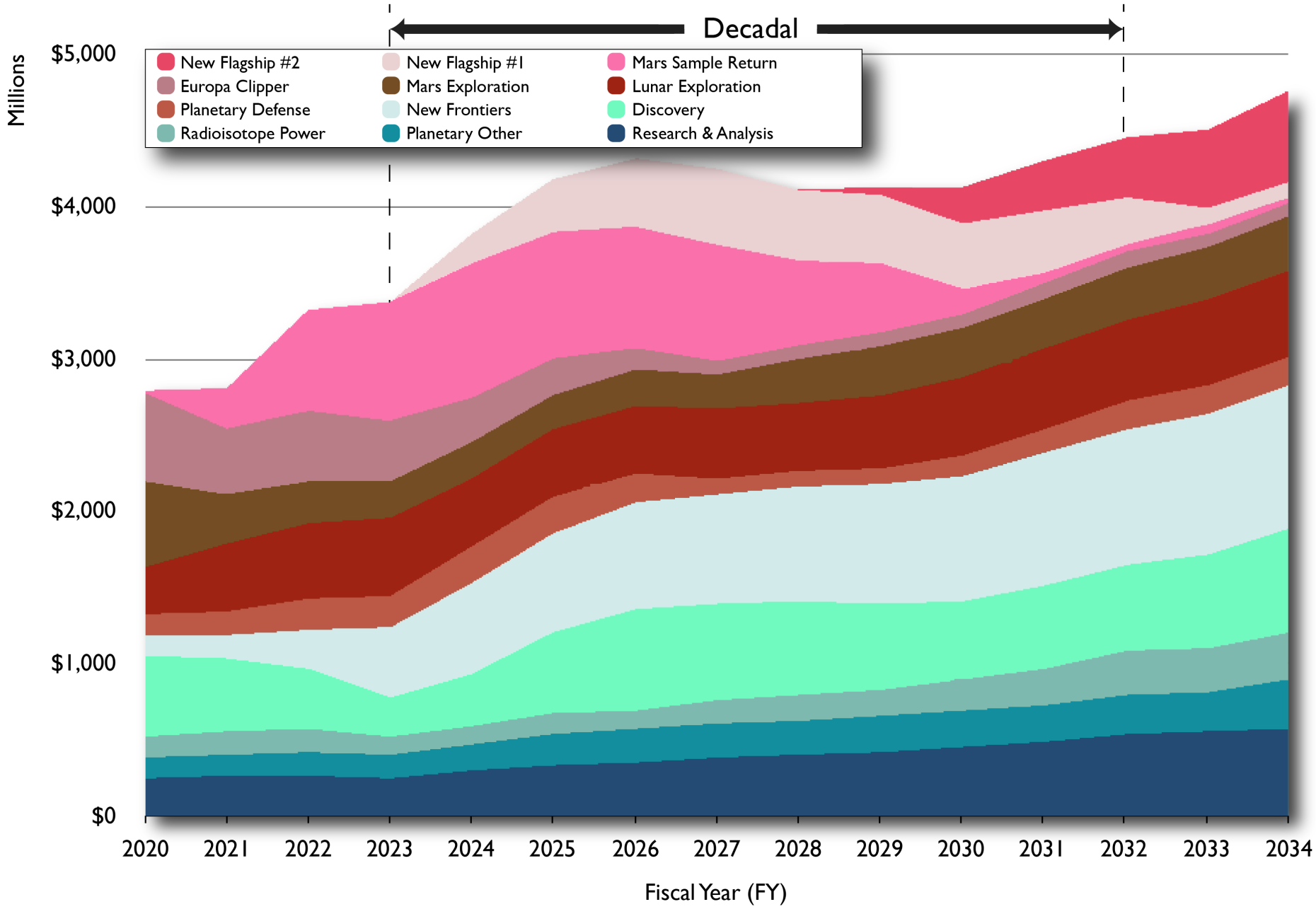
Money Talk

Recommended Program

Total PSD budget FY23– FY32:

$41,120M

Table 22.2, Fig 22.1

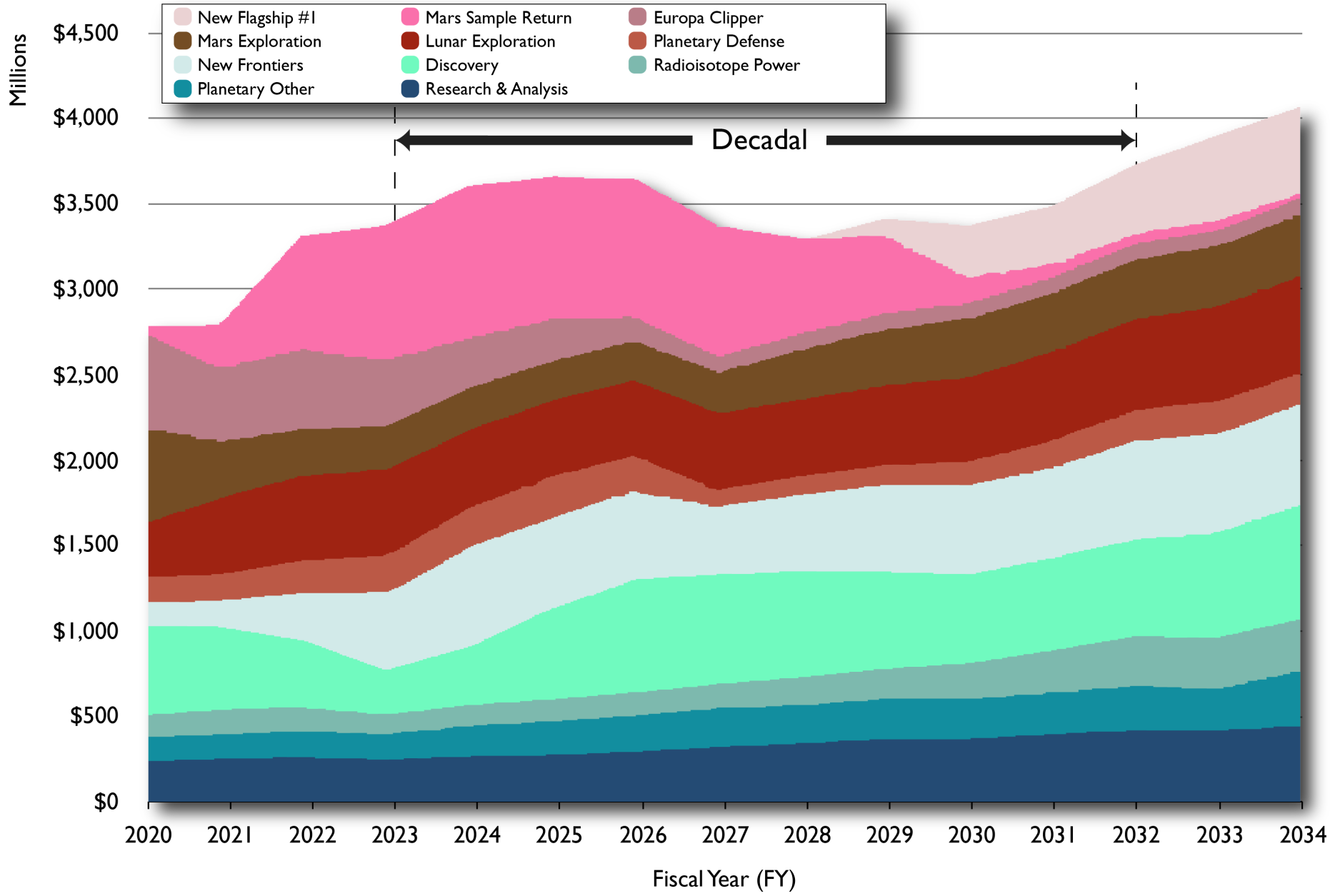


Level Program

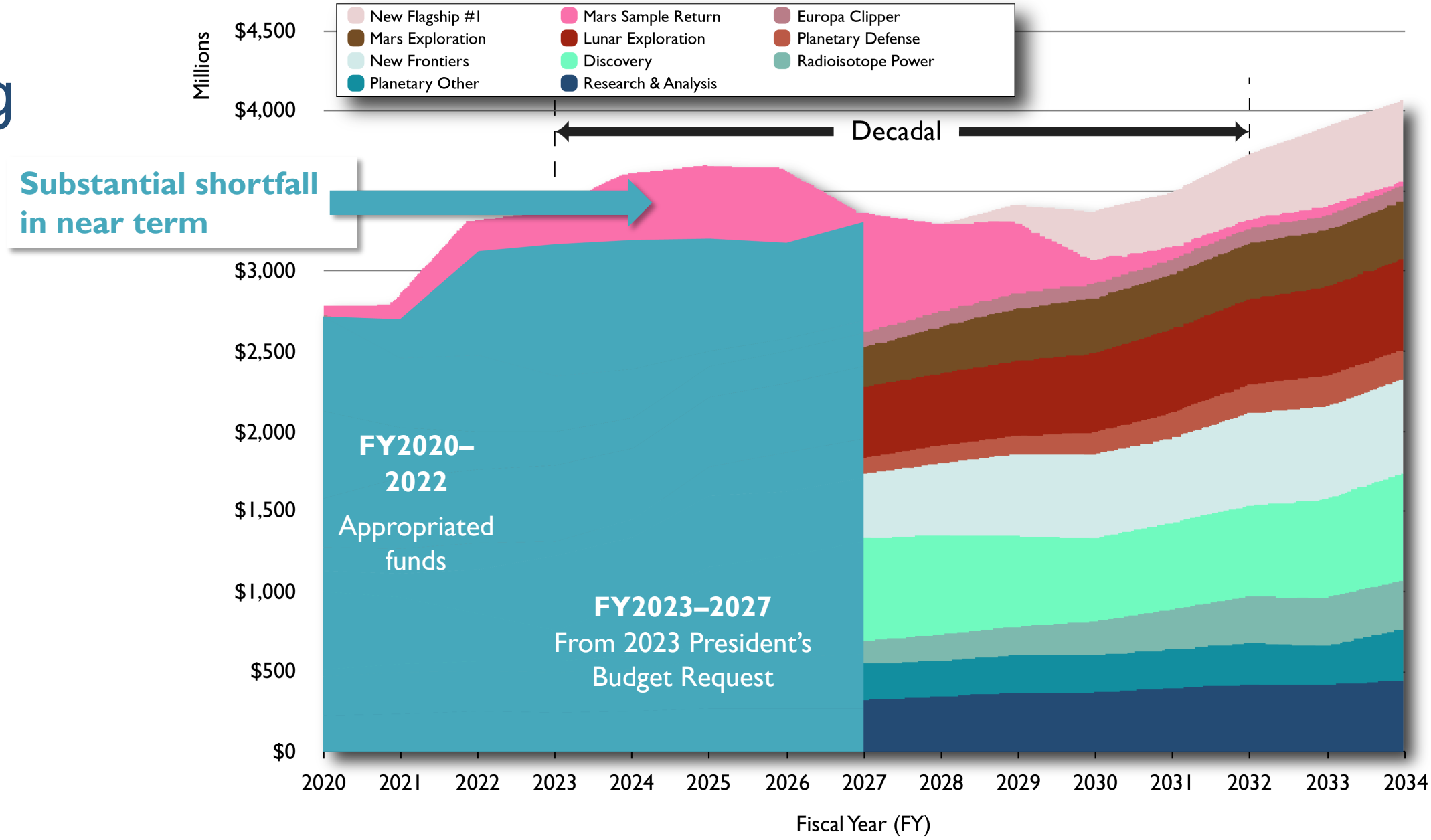
Total PSD budget FY23– FY32:

$34,990M

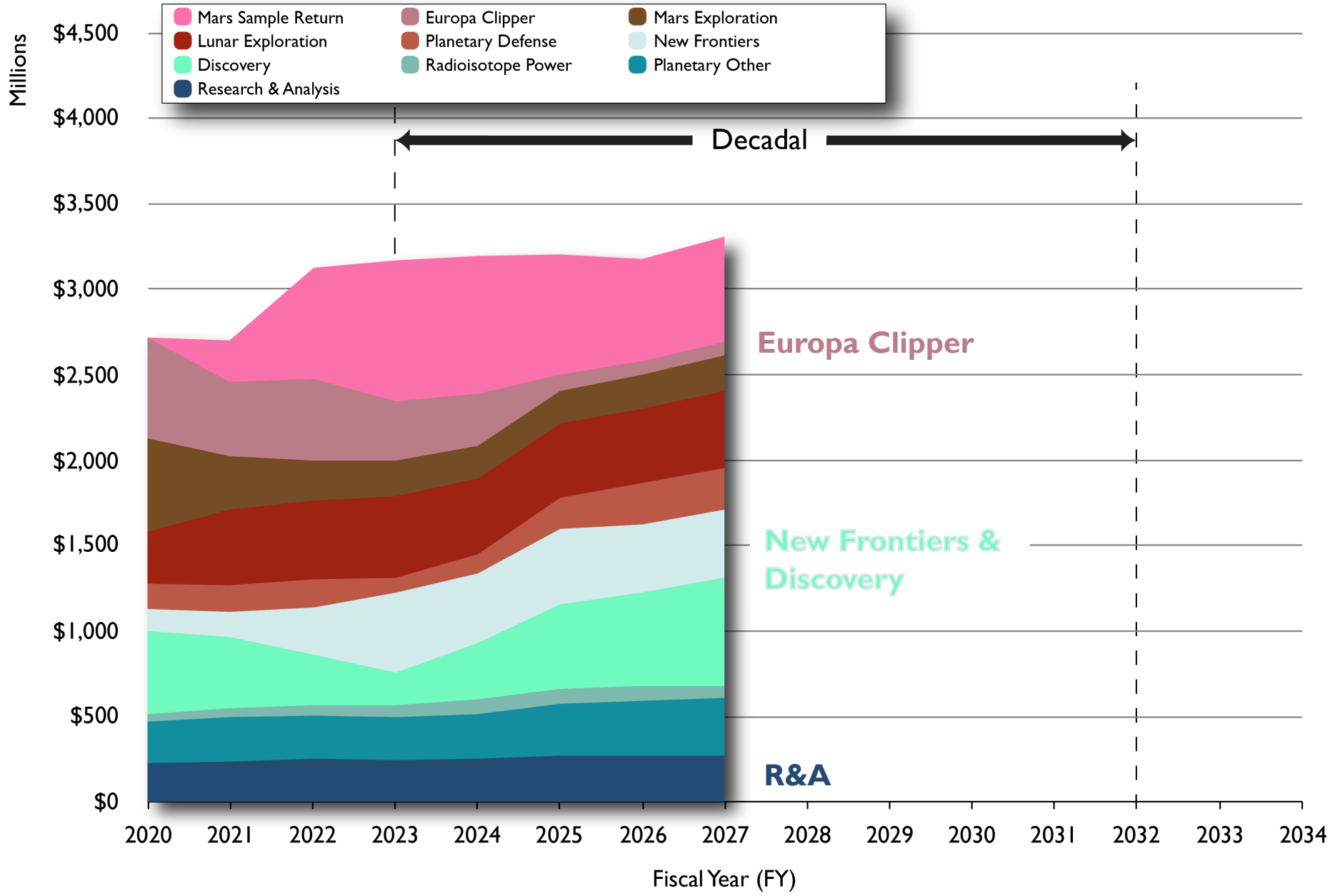
Table 22.2, Fig 22.2



Current Planning Budget



Other Budget Things



Rec. 22-2, 17-11

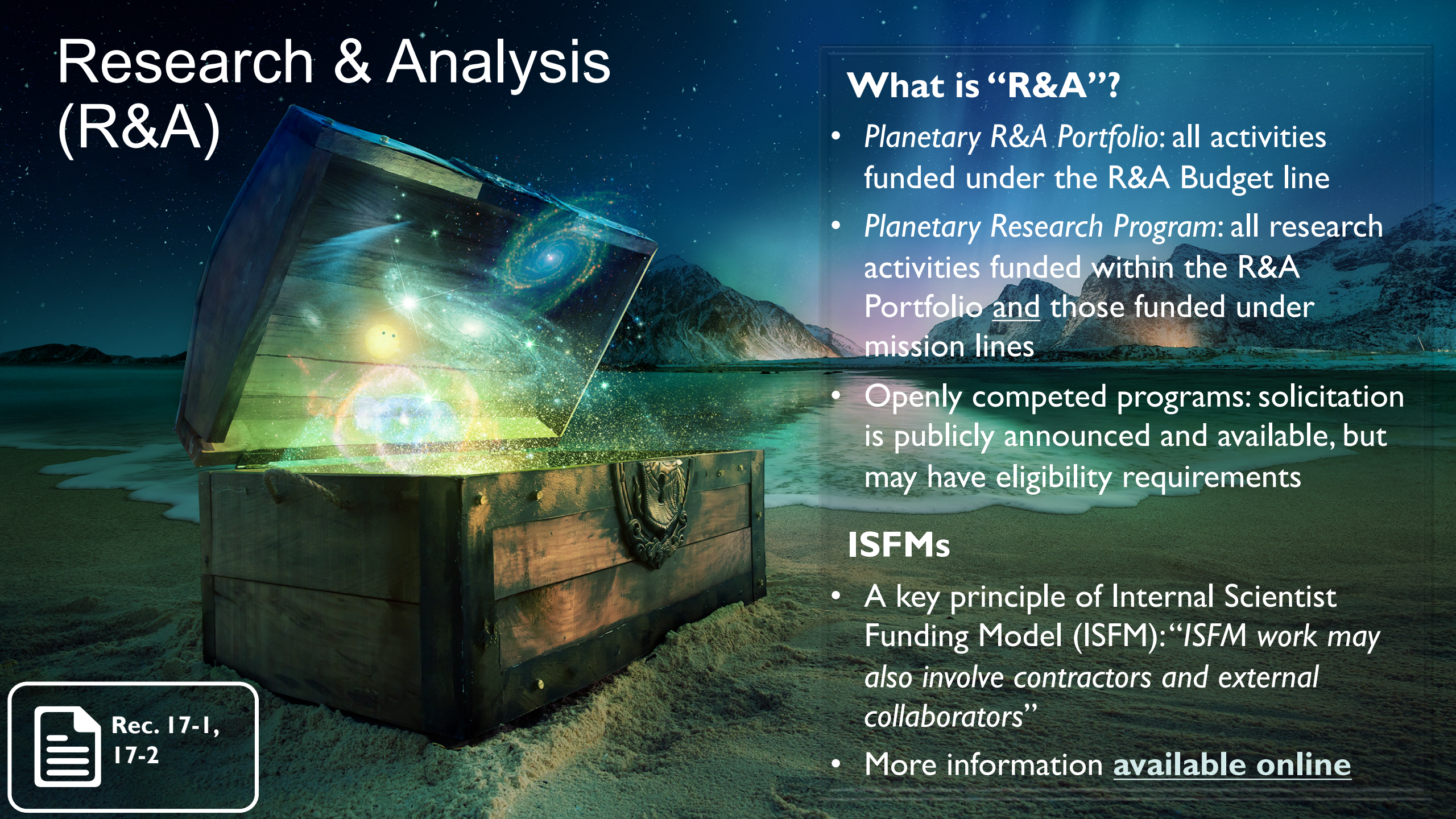
Budgetary Decision Rules

Priority order:

1. Delay the start of the next Flagship mission;
2. Reduce the number of new Discovery missions to four;
3. Reduce the funding level for Planetary Defense by removing the new-start mission after NEO Surveyor;
4. Reduce the cadence of New Frontiers in the coming decade;
5. Reduce the funding level for LDEP with a late-decade start of Endurance-A;
6. Reduce the funding level for MEP below the Level program;
7. Reduce the number of new Discovery missions to three; and
8. Reduce R&A funding.

Initial Response – Part 2

Research & Analysis (R&A)



What is "R&A"?

- *Planetary R&A Portfolio*: all activities funded under the R&A Budget line
- *Planetary Research Program*: all research activities funded within the R&A Portfolio and those funded under mission lines
- Openly competed programs: solicitation is publicly announced and available, but may have eligibility requirements

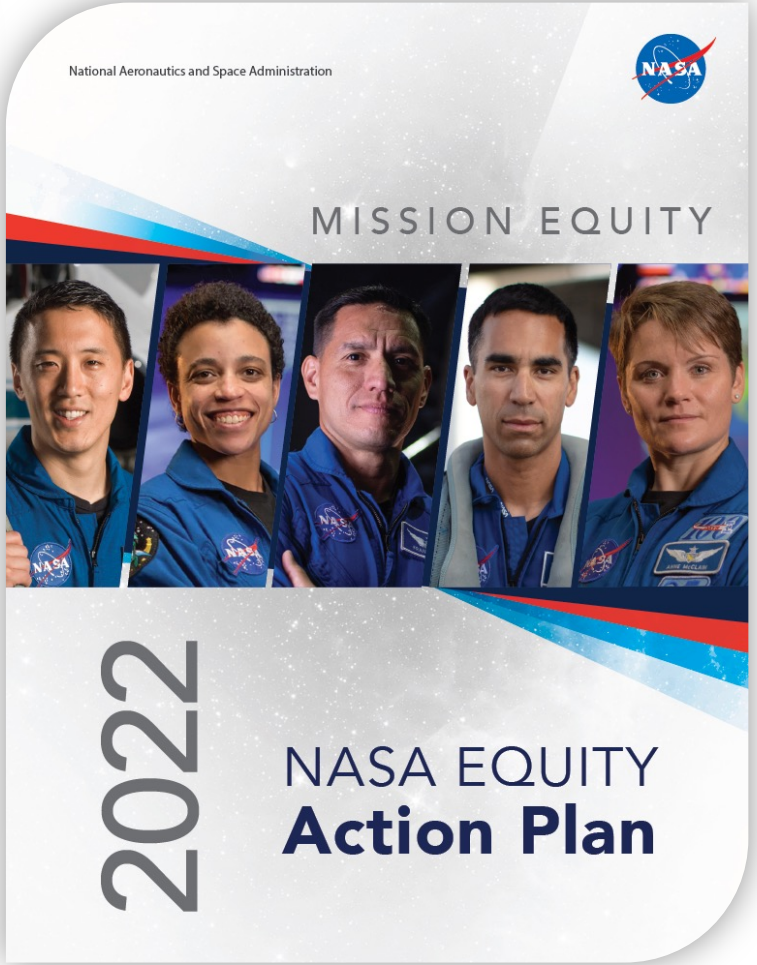
ISFMs

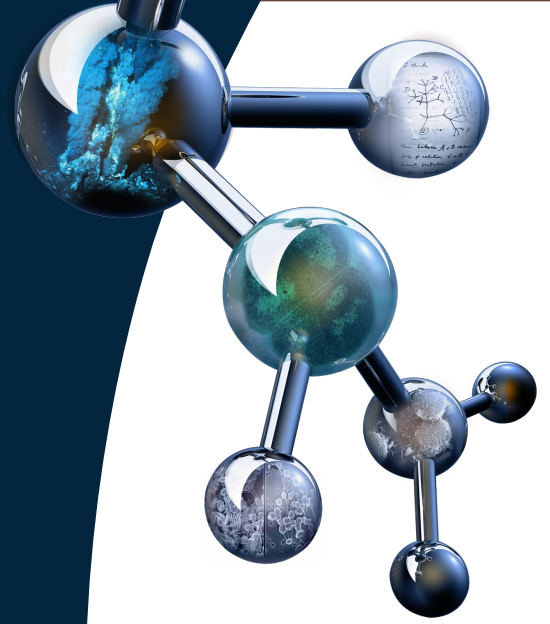
- A key principle of Internal Scientist Funding Model (ISFM): "*ISFM work may also involve contractors and external collaborators*"
- More information **available online**

Rec. 17-1, 17-2

State of the Profession

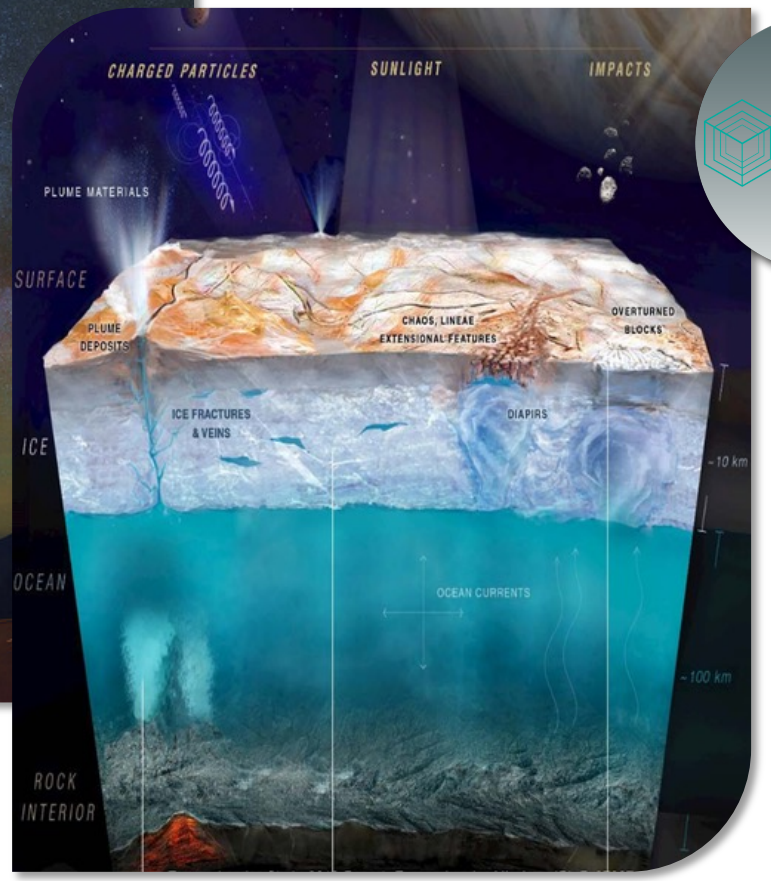
Chapter 16





Astrobiology

Rec. 22-16, 22-17

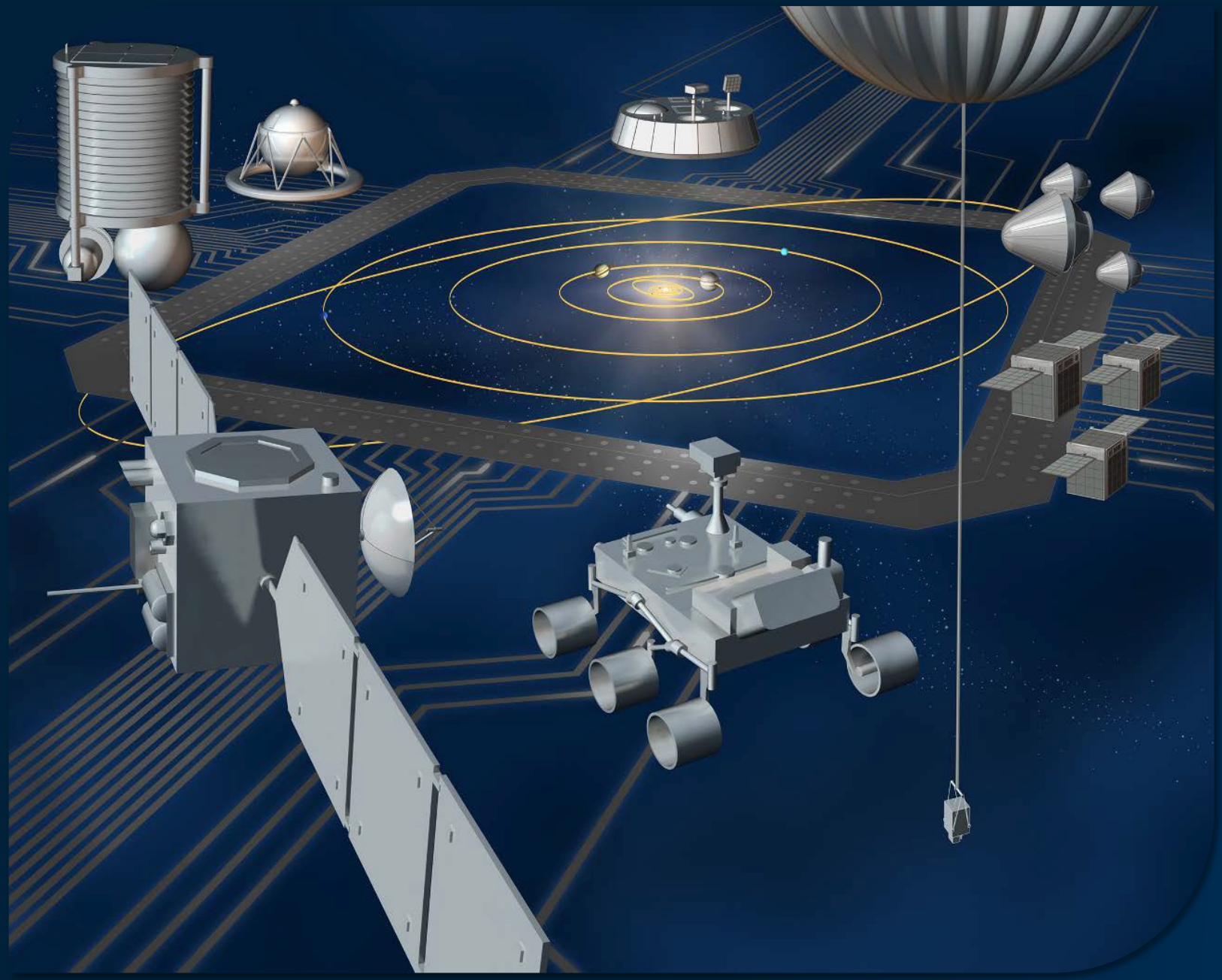


Research Coordination Networks

Scientific Exploration Strategies?

"NASA should develop scientific exploration strategies, as it has for Mars, in areas of broad scientific importance, e.g., Venus and ocean worlds, that have an increasing number of U.S. mission and international collaboration opportunities"

Rec. 22-5

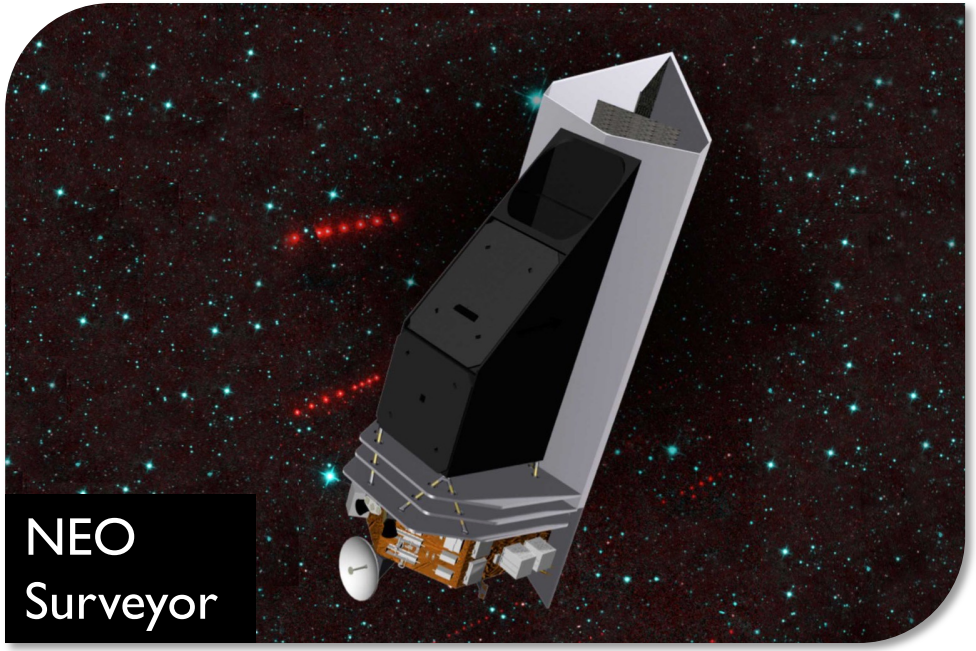


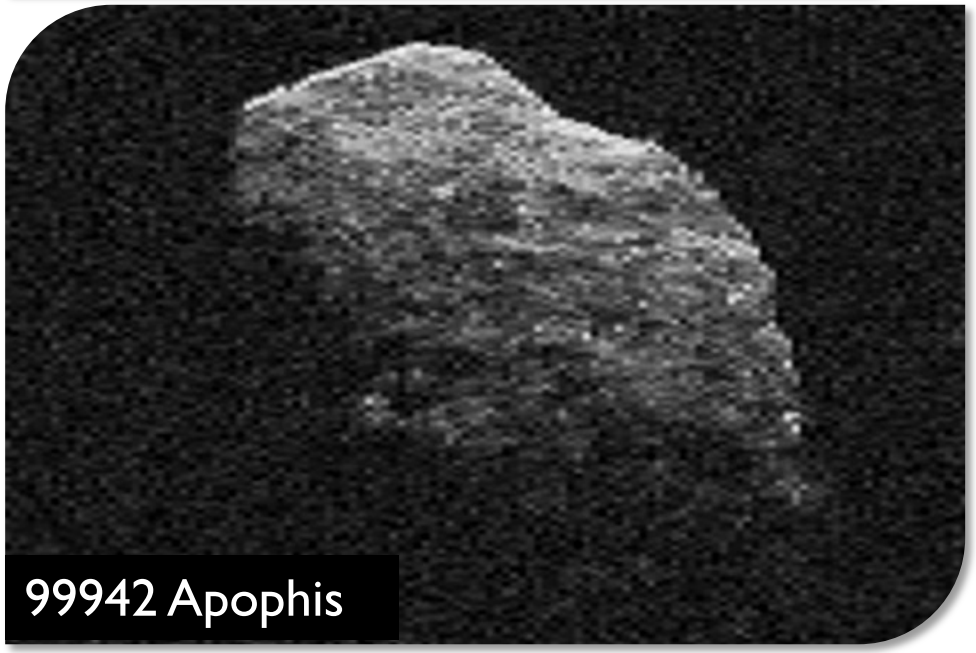
Technology

Rec. 21-2

2015 PSD Technology Plan available online

Planetary Defense





PLANETARY DEFENSE COORDINATION OFFICE
HIC SERVARE DIEM

Rec. 18-2, 18-4, 18-6, 18-9

LUNAR SURFACE EXPLORATION

2022–2026

NASA AWARDED CLPS DELIVERY GOALS

PEREGRINE-1 / 2-AB / ASTROBOTIC
- Regolith volatiles composition
- Local radiation environment

1ST NOVA-C / 2-IM & 20C / INTUITIVE MACHINES
- Plume/surface interactions, charged particles near surface
- Lander prop tank gauge test

2ND NOVA-C / PRIME-1/ INTUITIVE MACHINES
- Drilling for volatiles

XL-1 / 19C / MASTEN
- Regolith volatiles composition
- Surface terrain & mineralogy

BLUE GHOST-1 / 19D / FIREFLY
- Characterize Earth's magnetosphere and Moon's interior

GRIFFIN-1 / 20A / ASTROBOTIC
VIPER / NASA
- Search for volatiles, below surface and in permanently shadowed regions

3RD NOVA-C / CP-11 / INTUITIVE MACHINES
- Characterize Earth's magnetosphere and Moon's interior

SERIES-2 / CP-12 / DRAPER
- Characterize geophysical properties of the lunar interior as well as electric and magnetic properties

KEY

HUMAN EXPLORATION
SCIENCE
SPACE TECHNOLOGY
★ CLPS DELIVERY

Rec. 22-10, 22-11

SOUTH POLE SURFACE MISSIONS

1. **2ND NOVA-C**
   SHACKLETON CONNECTING RIDGE
   ★★
2. **XL-1**
   HAWORTH CRATER
   ★★
3. **GRIFFIN-1 & VIPER**
   NOBILE CRATER
   ★★
4. **CP-22**
   SOUTH POLE
   ★
5. **UNCREWED LANDER DEMO**
   SOUTH POLE

ARTEMIS

HUMANITY'S RETURN TO THE MOON

Planned launches:
Artemis I: Aug 29, 2022
Artemis II: 2024
Artemis III: 2025
Artemis IV+: 2027 and beyond

Rec. 19-2, 19-4

Stay Engaged!

NASEM Committee on Astrobiology and Planetary Sciences (CAPS)

Next meeting:
September 28 and 29, 2022 (Irvine, CA/hybrid)

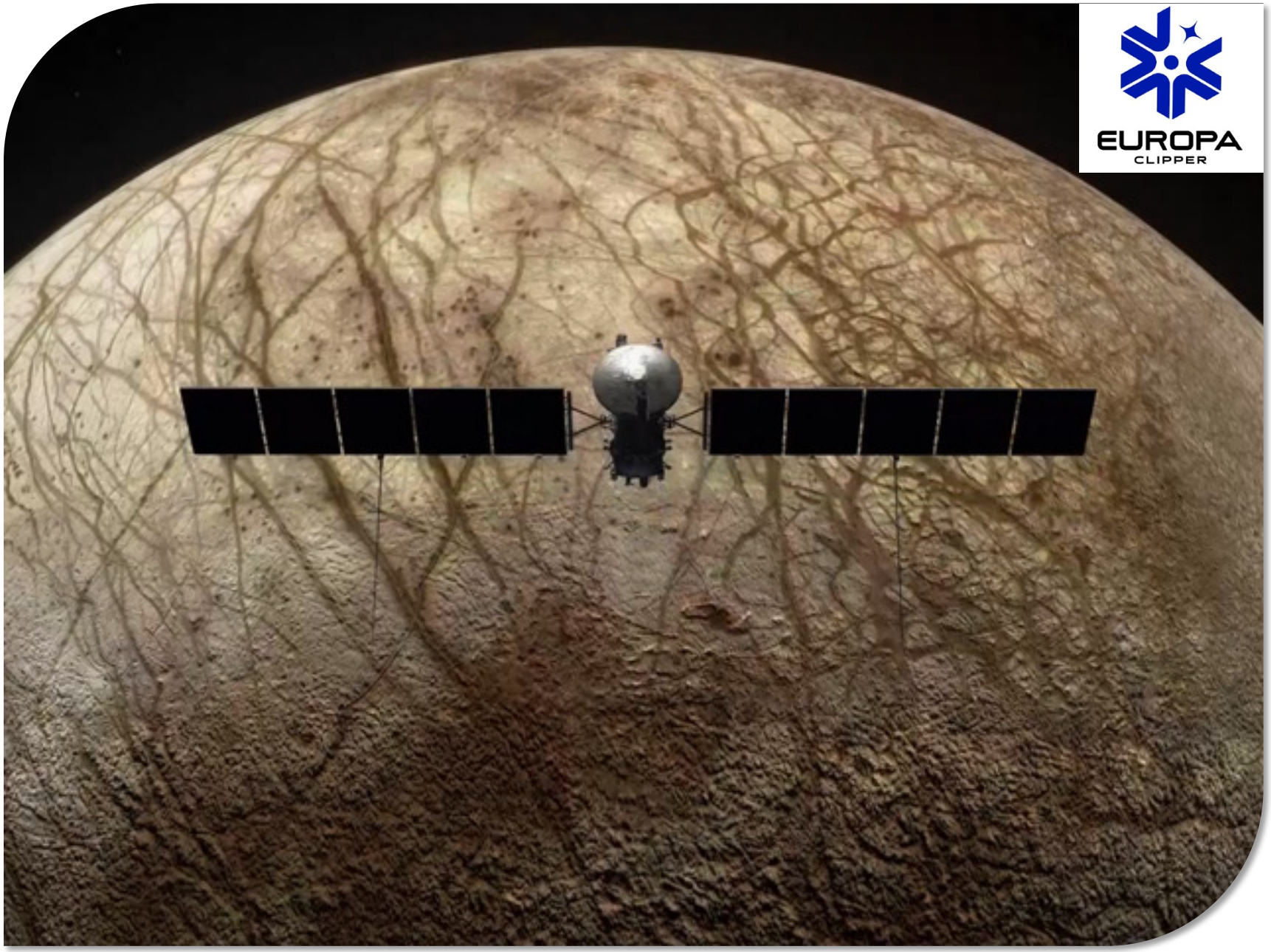
Planetary Science Advisory Committee

Next meeting (TBC):
December 5 and 6, 2022

Planetary Science Assessment/Analysis Groups

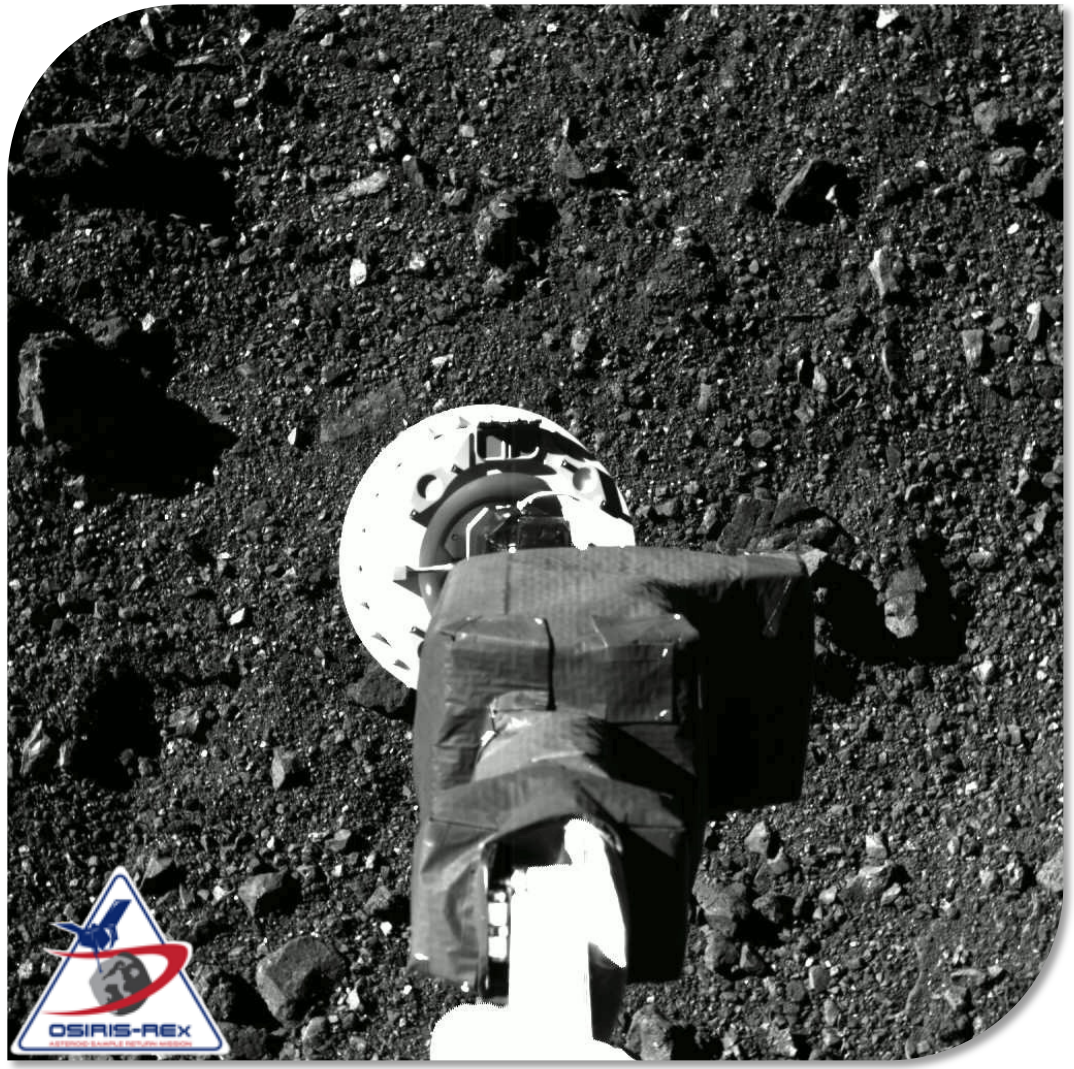
Astrobiology Research Coordination Networks

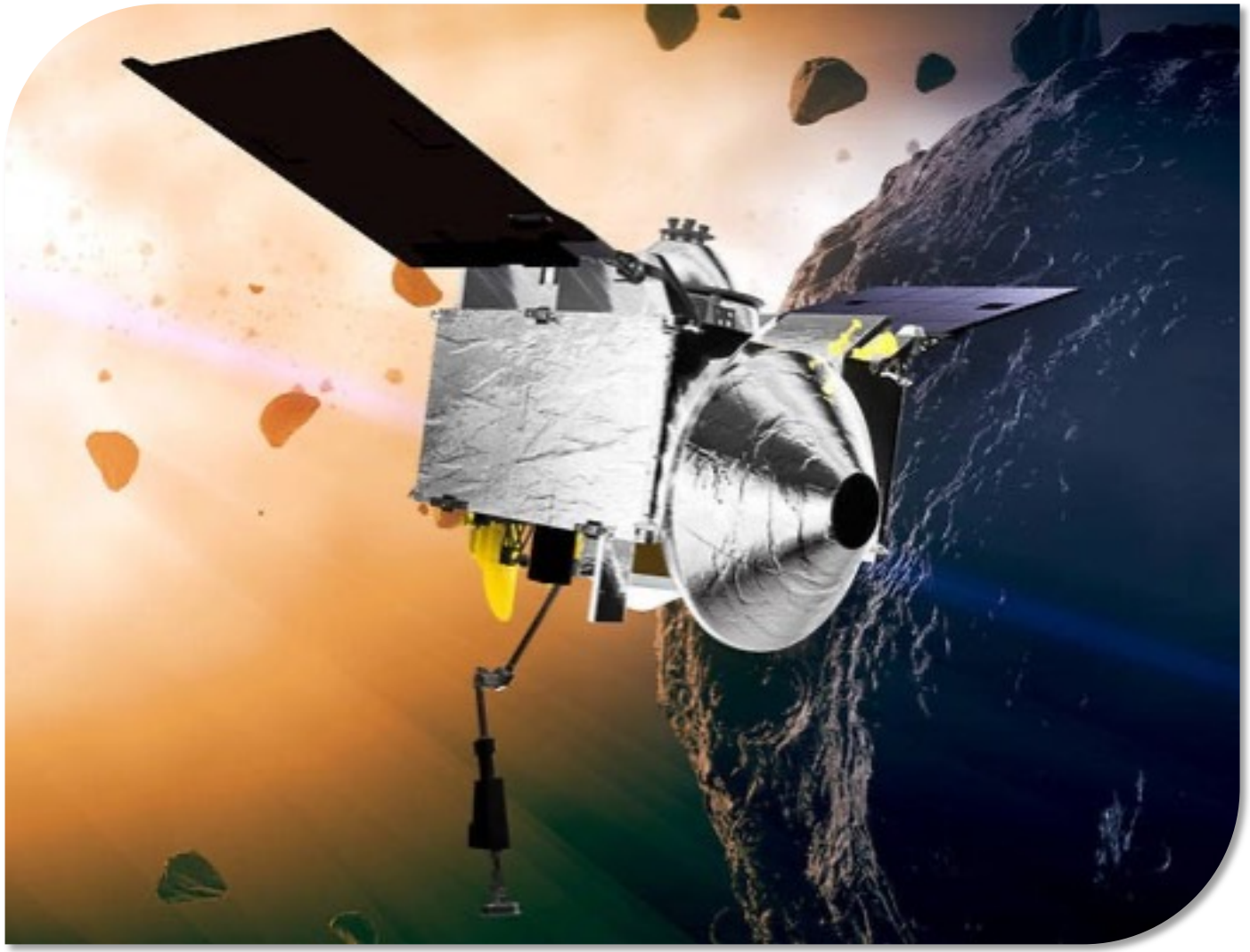

Coming Soon in
PSD



Targeted Launch:
October 2024
Jupiter Orbit
Insertion: April 2030
Science Instruments: 9

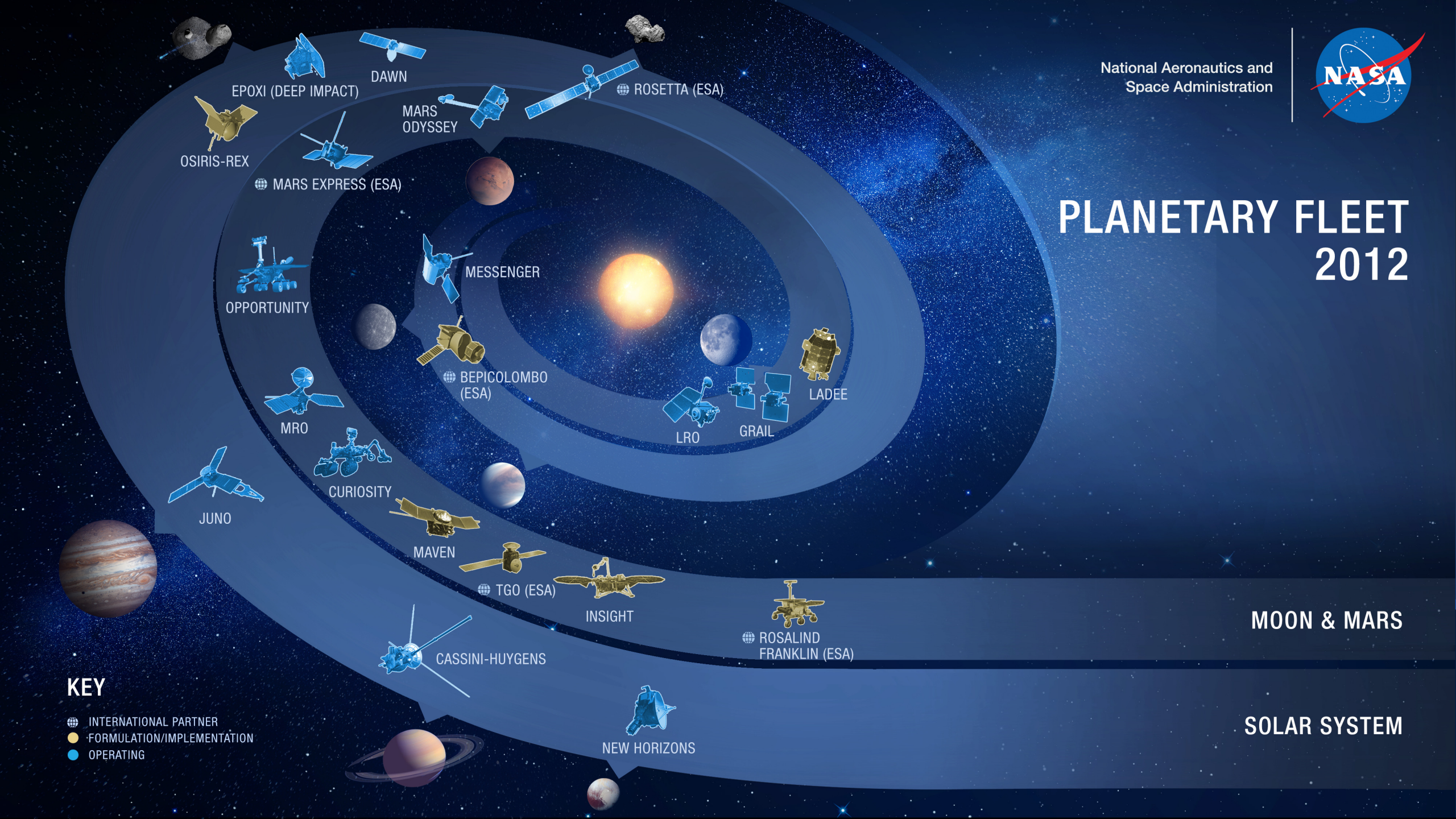
OSIRIS-REx / APEX

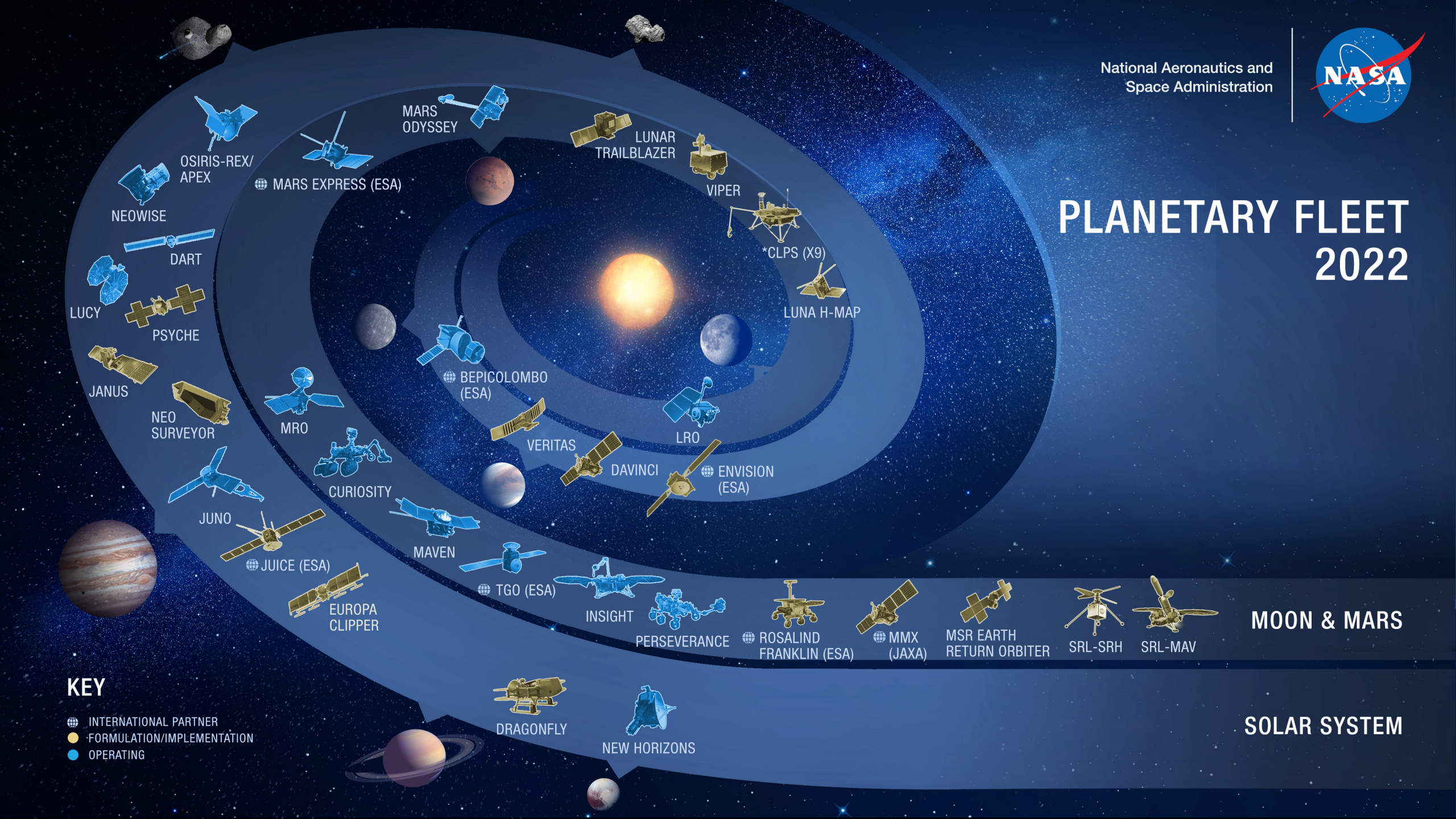





DART
Double Asteroid Redirection Test
Impact: September 26, 2022,
7:14 pm Eastern

Wind the Clock


National Aeronautics and Space Administration
NASA
PLANETARY FLEET 2012
EPOXI (DEEP IMPACT)
DAWN
ROSETTA (ESA)
MARS ODYSSEY
OSIRIS-REX
MARS EXPRESS (ESA)
OPPORTUNITY
MESSENGER
BEPICOLOMBO (ESA)
LADEE
LRO
GRAIL
MRO
CURIOSITY
JUNO
MAVEN
TGO (ESA)
INSIGHT
ROSALIND FRANKLIN (ESA)
CASSINI-HUYGENS
NEW HORIZONS
MOON & MARS
SOLAR SYSTEM
KEY
INTERNATIONAL PARTNER
FORMULATION/IMPLEMENTATION
OPERATING


National Aeronautics and Space Administration
NASA
PLANETARY FLEET 2022
OSIRIS-REX/ APEX
NEOWISE
MARS EXPRESS (ESA)
MARS ODYSSEY
LUNAR TRAILBLAZER
VIPER
*CLPS (X9)
LUNA H-MAP
DART
LUCY
PSYCHE
JANUS
NEO SURVEYOR
MRO
BEPICOLOMBO (ESA)
VERITAS
DAVINCI
LRO
ENVISION (ESA)
CURIOSITY
JUNO
JUICE (ESA)
MAVEN
TGO (ESA)
EUROPA CLIPPER
INSIGHT
PERSEVERANCE
ROSALIND FRANKLIN (ESA)
MMX (JAXA)
MSR EARTH RETURN ORBITER
SRL-SRH
SRL-MAV
MOON & MARS
KEY
INTERNATIONAL PARTNER
FORMULATION/IMPLEMENTATION
OPERATING
DRAGONFLY
NEW HORIZONS
SOLAR SYSTEM


EXPLORE
With Us